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TITLE OF INVENTION	
54	"PRODUCTION OF DECORATED SHEET MATERIAL"

THIS invention relates to the production of decorated polymeric products such as sheet material and more particularly to the production of decorated sheet material produced from glass fibre reinforced polyester resin. The sheet material produced according to the present invention may be either flat or profiled and may be used in various industrial and domestic applications, such as in the construction of roofs or patio coverings, or as fascia boards or decorative wall paneling. One form of the invention provides for the production of striped polyester panels which, it is expected, will become increasingly popular in the trade in particular for the construction of patios and the like.

It is known in the trade to produce striped polyester panels by depositing a dye or pigment containing liquid or paste in stripes on a barrier or release sheet of film such as a cellulose film. The deposited stripe material is then partially cured by heating and the liquid polyester resin is then deposited on the partially cured stripes and suitable reinforcing means such as chopped glass fibres are thereupon deposited onto the polyester composition either with or without a further reinforcing layer of polyester sheeting. After covering the uncured mass with a top release film,

which may also be in the form of a cellulose film, the uncured composition is passed through a curing and forming oven in which the resin is cured and integrated with the partially cured striped material while the sheet member is formed into a desired profile by means of formers located in the forming oven. On emerging from the forming oven, the cured sheet is trimmed along the edges thereof and the sheet is cross-cut into required lengths.

Striped panels formed in the manner described above suffer from various disadvantages and in particular that process is recognised as a very sensitive process in that the stripe material has to be cured to exactly the correct degree of curing before the main charge of polymeric material is deposited thereon. Undercuring of the stripe material results in bleeding of the stripe material into the polyester resin and results in an unattractive product in that the dividing lines between the striped material and the intermediate polyester material are not as sharp as would be preferred while on the other hand the overcuring of the striped material prevents the proper subsequent integration thereof with the polyester material and the result is that the stripe material in the final product is prone to chipping or flaking.

It is an object of the present invention to provide a method for the manufacture of decorative polyester panels and in particular striped polyester panels of any desired profile in which the above disadvantages are substantially eliminated.

According to the present invention a method of forming decorated polymeric products is characterized in that it includes the steps of incorporating in an uncured mass of liquid polymeric material a pre-printed decorative sheet of tissue material which is compatible with the polymeric material and curing the polymeric material by the application of heat.

The polymeric material is preferably a polyester material.

In one form of the invention the uncured polyester material is formed into a bed on a suitable working surface and the tissue material is in the form of a pre-printed sheet and is in use soaked into the bed of uncured polyester material before the material is cured to produce a polyester product in the form of a sheet.

The sheet formed in the manner described above may

be prof~~o~~id during the curing stag~~o~~y being passed through a forming oven which includes one or more sets of formers.

The tissue material preferably comprises a polyacrylic or a polyester tissue. Furthermore, the tissue material is preferably a calendered polyacrylic or polyester tissue material and of a density of the order of 20 to 40 g/m². In the preferred form of the invention the tissue material is a polyacrylic tissue material calendered to a density of 30 g/m².

The tissue material is preferably pre-printed with a printing ink which may be either water or solvent based. The printing ink is preferably UV stabilized and the tissue is preferably printed on both sides by means of a rotogravure process.

Thus in one form according to the invention the tissue may be a polyacrylic tissue of the type sold under the trade name Viledon and which is obtainable in South Africa from Freudenberg Nonwovens (Pty.) Limited.

A reinforced polyester sheet material incorporating a pre-printed tissue material may be produced according to the invention by providing a

continuously moving first surface film, depositing a mass of polymerizable liquid polyester material on the moving surface film, spreading the mass of polymerizable polyester to a form a bed of substantially uniform thickness over the moving surface layer, depositing surface tissue and reinforcing fibres onto the bed of polyester material, depositing a pre-printed polyester or polyacrylic tissue sheet over the reinforced unpolymerized polyester mass and applying pressure thereto to soak the tissue sheet in the liquid polyester, applying a top surface film over the composition, passing the composite product through a forming oven to cure the polyester material and cutting the cured sheet material to the desired length and width.

The surface tissue material is preferably a tissue material constituted by continuous monofilament C-glass which preferably has a density of 20 g/m². The reinforcing fibres are preferably E-glass rovings of approximately 50 mm in length.

The liquid polymeric resin material is preferably a translucent sheeting grade polyester resin which may be either clear or pigmented and which is preferably ultraviolet light stabilized.

In the preferred form of the invention the polyester resin is preferably an S.A.B.S. approved sheeting grade polyester resin.

The temperature of the curing oven may be between 65 and 120 °C.

Without thereby limiting the scope of the present invention a preferred embodiment of the production process for forming a decorated reinforced polyester sheet will now be described with reference to the accompanying drawing which is a schematic representation of the apparatus used in carrying out the method according to the invention.

In the accompanying drawing there is illustrated a table 1 defining a working surface which is heated from below by means of water at a temperature of about 75 °C circulating through compartments 2 which define the working top of the table.

A lower surface layer in the form of a polyester release film 3 is passed continuously over the table by means of suitable feed rollers [not shown] and a take up roller 14. S.A.B.S. approved translucent sheeting grade polyester resin [R] which is UV stabilized and which may either be clear or pigmented is deposited onto the release

film 3 a feeding head schematically illustrated at 4. The polyester resin is spread to a required thickness by means of a doctor blade shown at 5 substantially to cover the width of the polyester release film 3. A glass fibre tissue material 6 produced from continuous monofilament C-glass and having a density of approximately 20 g/m² is then impregnated into the polyester resin and glass rovings in the form of 50 mm long E-glass continuous rovings cut from glass strings are thereupon deposited onto the impregnated glass tissue as illustrated at 7.

A decorative pre-printed calendared polyacrylic tissue is then deposited onto the moving mass as illustrated at 8 and the tissue is soaked with the polyester resin. In the illustrated embodiment the decorative feature of the polyacrylic tissue comprises a stripe pattern in a colour which contrasts the cured colour of the polyester resin. A top film 10, also in the form of a polyester release film, is then positioned across the uncured sheet with the aid of a pressure roller 10.

The polyester resin is thereupon cured in a curing and forming oven illustrated at 11 which oven is provided with conventional formers [not shown] to form the sheet into the desired profile. The oven

of the sheet member is not necessarily restricted to a striped product but that any form of decoration may be pre-printed on the tissue material applied from roll 8 and that the pattern which had been pre-printed onto the tissue material would be repeated in the final product.

It has been found necessary to treat the polyacrylic material obtainable under the trade mark Viledon by calendering that product through the application of pressure and heat rolling to a density of about 30 g/m^2 to ensure that the printing ink is properly retained thereon. It has also been found that the best results are obtainable by the use of a rotogravure process and by printing the Viledon on both sides thereof.

In carrying out the process according to the invention it has been found that the calendered pre-printed material plays an important role in counteracting internal stresses in the cured sheet and that the reverse filtering effect which is experienced when a pigmented polyester resin is used in the production of the sheet material accounts for a good definition and consistency of quality of the decorated product and that the coloured stripes are not in danger of splitting or bleeding as is the case with conventional products.

is heated by means of heated air, a temperature of between 65 and 120°C which heated air is fed into the oven as is schematically illustrated at 12.

On emerging from the oven as a continuous profiled sheet member, the surface layers 3 and 10 are stripped from the product by means of stripping or take up rollers 13 and 14. The edges of the profiled sheet member are then trimmed by means of side trimming saws 15 and the sheet is cut to the desired length by means of a travelling cross-cutting saw 16 in the manner which is known in the trade.

It will be understood that in instances where a striped profile stripe product is to be produced as illustrated in the drawing, the formers in the forming oven and the roll 8 of striped pre-printed tissue would be positioned such that the stripes are located at the desired position in the profiled product. In the illustrated embodiment the stripes are formed along the crests of the I.B.R type profile but it will be appreciated that it could also be arranged such that the coloured stripes are positioned in the valleys or even on the risers between the valleys and the crests. It will further be appreciated that the form of decoration

The invention relates to the method of producing the decorated reinforced polymeric panels and also to a calendered polyacrylic tissue material pre-printed with a design and adapted to be incorporated into a polymeric specifically a polyester sheet material.

1. A method of forming a decorated polymeric product including the steps of incorporating in an uncured mass of liquid polymeric material a pre-printed decorative sheet of tissue material which is compatible with the polymeric material and curing the polymeric material by the application of heat.
2. The method of claim 1 wherein the polymeric material is polyester material.
3. The method of claim 2 wherein the uncured polyester material is formed into a bed on a suitable working surface and the tissue material is in the form of a pre-printed sheet and is in use soaked into the bed of uncured polyester material before the material is cured to produce a polyester product in the form of a sheet.
4. The method of claim 3 in which the sheet formed is profiled during the curing stage by being passed through a forming oven which includes one or more sets of formers.
5. The method of any one of the preceding claims in which the tissue material comprises a polyacrylic or a polyester tissue.

6. The method of claim 5 in which the tissue material is a polyacrylic or polyester tissue material and of a density of the order of 20 to 40 g/m².
7. The method of claim 6 wherein the tissue material is a polyacrylic tissue material calendared to a density of 30 g/m².
8. The method of claim 1 wherein the tissue material is pre-printed with a printing ink.
9. The method of claim 8 wherein the tissue material is pre-printed with a UV stabilized printing ink.
10. The method of claim 8 or 9 wherein the tissue material is a material printed on both sides by means of a rotogravure process.
11. The method of claim 1 wherein the tissue material is a polyacrylic tissue of the type sold under the trade name VILENE.
12. The method of any one of the preceding claims for the production of a reinforced polyester sheet comprising the steps of providing a continuously moving first surface film,

depositing a mass of polymerizable liquid polyester material on the moving surface film, spreading the mass of polymerizable polyester to a form a bed of substantially uniform thickness over the moving surface layer, depositing surface tissue and reinforcing fibres onto the bed of polyester material, depositing a pre-printed polyester or polyacrylic tissue sheet over the reinforced unpolymerized polyester mass and applying pressure thereto to soak the tissue sheet in the liquid polyester, applying a top surface film over the composition, passing the composite product through a forming oven to cure the polyester material and cutting the cured sheet material to the desired length and width.

13. The method of claim 12 wherein the surface tissue material is a tissue material constituted by continuous monofilament C-glass.
14. The method of claim 13 wherein the surface tissue material has a density of about 20 g/m².
15. The method of claim 12 wherein the reinforcing

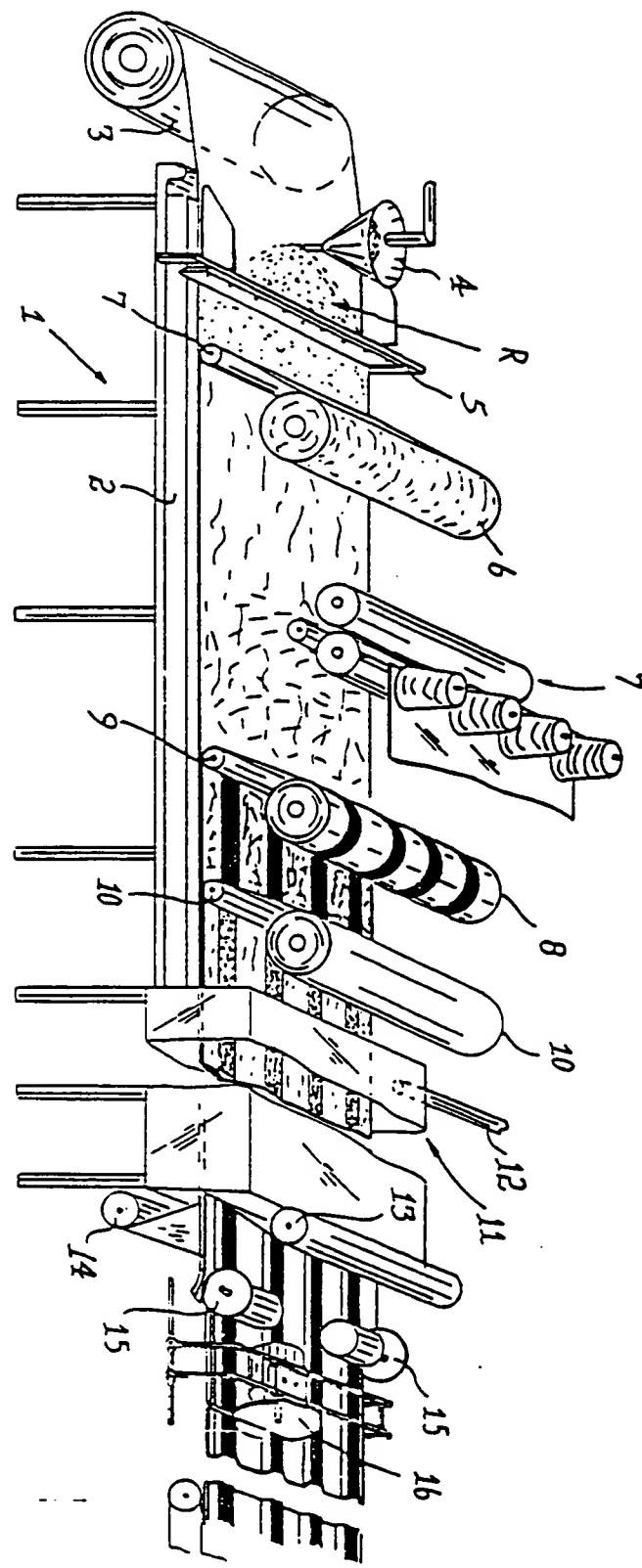
fibres are in the form of E-glass rovings of approximately 50 mm in length.

16. The method of any one of the above claims wherein the liquid polymeric resin material is translucent sheeting grade polyester resin. --
17. The method of claim 16 wherein the polyester resin is clear.
18. The method of claim 16 wherein the polyester resin is pigmented and ultraviolet light stabilized.
19. The method of producing a decorated material substantially as herein described.
20. A product produced by the process claimed in any one of claims 1 to 19.

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